

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. – 43. (Cancelled)

44. (Previously Presented) An optical-waveform-sensitive routing system comprising:

- (a) a router responsive to change the routing of data in response to an optical pulse having a prescribed detectable temporal waveform; and
- (b) a composite grating for receiving input light pulses along an input path and transmitting, in response thereto, output light pulses to the router along an output path, the grating comprising an ordered assemblage of subgratings supported by an active material wherein
 - (1) each respective subgrating satisfies at least one of (i) a Bragg condition or (ii) a surficial grating condition so as to diffract a respective subbandwidth of light from the input path to the output path, and
 - (2) the subgratings are so configured such that an optical pulse received by the composite grating, interacting with the active material along the input path and having a prescribed address encoded input temporal waveform different from the prescribed detectable temporal waveform, triggers an output optical pulse along the output path having the prescribed detectable temporal waveform.

45. – 55. (Cancelled)

56. (Currently Amended) An optical routing system composite grating, comprising:
an active material; [[and]]
an ordered assemblage of subgratings supported by the active material, wherein

- (1) the subgratings are configured to receive an input optical pulse from an input path and to generate an output optical pulse along one of multiple angularly

distinct output directionspaths, if the input optical pulse includes an address temporal code substantially similar to one of a set of address temporal codes encoded in the subgratings, each of the set of address temporal codes corresponding to one of the angularly distinct output directionspaths,

(2) the subgratings are configured to transmit noise if the input optical pulse does not include a temporal waveform substantially similar to one of the set of address temporal codes,

(3) the set of address temporal codes are each formable within the active material using address pulses each containing one of the set of address temporal codes and incident on the active material along the input path, and

(4) the multiple angularly distinct output directionspaths are established using direction pulses each incident on the active material along one of the multiple angularly distinct output directionspaths[[.]];

an address decoder to decode routing addresses corresponding to each of the angularly distinct output paths; and

a deflector to deflect the direction pulses in response to the address decoder to establish each of the angularly distinct output paths.

57. (Currently Amended) The ~~composite grating~~ optical routing system of claim 56 wherein the subgratings comprise spatial-spectral gratings.

58. (Cancelled).

59. (Currently Amended) The ~~composite grating~~ optical routing system of claim 57 wherein the active material comprises a non-frequency selective material.

60. (Currently Amended) The ~~composite grating~~ optical routing system of claim 57 wherein the subgratings are formed on a surface of the active material.

61. (Currently Amended) The ~~composite grating optical routing system~~ of claim 57 wherein the subgratings are formed within a volume of the active material.
62. (Currently Amended) The ~~composite grating optical routing system~~ of claim 56 wherein the subgratings comprise optical interference gratings supported by the active material and generated by interfering the address pulses with the direction pulses.
63. (Currently Amended) An ~~optical routing communication~~ system, comprising:
~~an optical source to generate an input optical signal along an input path;~~
~~an active material; [[and]]~~
an ordered assemblage of subgratings supported by the active material, wherein
(1) the subgratings are configured to receive the input optical signal along the input path and to generate an output optical signal routed along ~~a first output path~~ ~~one of multiple angularly distinct output directions~~, if the input optical signal includes a[[n]] first address temporal code substantially similar to ~~one of a set of a second~~ address temporal code[[s]] encoded in the subgratings, ~~each of the set of address temporal codes corresponding to one of the angularly distinct output directions~~,
(2) the subgratings are configured to transmit noise if the input optical signal does not include a ~~temporal waveform~~ substantially similar to ~~one of the set of the~~ first address temporal code[[s]],
— (3) the ~~set of address temporal codes~~ are each formable within the active material using ~~address pulses~~ each containing ~~one of the set of address temporal codes~~ and incident on the active material along the input path, and
— (4) the ~~multiple angularly distinct output directions~~ are established using ~~direction pulses~~ each incident on the active material along ~~one of the multiple angularly distinct output directions~~.
~~multiple output waveguides positioned to receive optical signals output from the active material along multiple angularly distinct output paths including the first output path;~~
~~an address decoder to decode routing addresses corresponding to each of the angularly distinct output paths; and~~

a deflector to deflect a programming direction pulse in response to the address decoder to impinge on the active material along the first output path to establish the first output path.

64. (Currently Amended) The communication optical routing system of claim 63 wherein the subgratings comprise spatial-spectral gratings.

65. (Cancelled)

66. (Currently Amended) The communication optical routing system of claim 64 wherein the active material comprises a non-frequency selective material.

67. (Currently Amended) A method, comprising:

providing an active material capable [[of]]to support[[ing]] an optical interference grating;

programming the active material with the optical interference grating, the optical interference grating providing a spatial-spectral structure corresponding to an interference of an address programming pulse and a direction programming pulse, the address programming pulse comprising a first temporal address waveform propagating along a first angular direction and the direction programming pulse propagating along a second angular direction different from the first angular direction; and

directing an optical beam to impinge upon the optical interference grating along the first angular direction, the optical beam including a second temporal address waveform substantially similar to the first temporal address waveform so as to cause the optical interference grating to produce, in response, an output optical pulse propagating along the second angular direction determined by the second-direction programming pulse, wherein the optical beam comprises a coded optical data stream convolved with the first temporal address waveform.

68. – 69. (Cancelled)

70. (Previously Presented) The method of claim 67 wherein the active material comprises a non-frequency selective material.
71. (New) The optical routing system of claim 56, further comprising:
multiple output waveguides corresponding to each of the multiple angularly distinct output paths and positioned to receive the output optical pulse from each of the angularly distinct output paths.
72. (New) The optical routing system of claim 71, further comprises:
a beam splitter positioned to reflect the direction pulses onto the active material along the multiple angularly distinct output paths in a counter-propagating direction and to pass the output optical pulse to one of the multiple output waveguides.
73. (New) The optical routing system of claim 72, further comprising:
a lenses positioned between the active material and the beam splitter to collimate the output optical pulse into one of the multiple output waveguides.